

Meteorological record of voluntary observers, etc.—Continued.

Stations.	Temperature.				Stations.	Temperature.			
	Maximum.	Minimum.	Mean.	Rainfall.		Maximum.	Minimum.	Mean.	Rainfall.
<i>Indiana—Continued.</i>	°	°	°	Inches	<i>Missouri—Contin'd.</i>	°	°	°	Inches
Spiceland	54	—3	30.8	2.36	Pierce City *	65	—3	37.3	1.60
Sunman *	51	—2	31.9	2.22	Springfield	62	0	38.0	1.50
Terre Haute *	58	—2	4.03	2.02	<i>Montana.</i>				
Vevay	62	7	36.9	2.02	Assinaboine, Fort.	67	—18	31.5	0.08
<i>Iowa.</i>					Ellis, Fort.	58	—15	31.1	0.75
Bancroft	53	—14	22.2	0.40	Keogh, Fort.	69	—15	29.6	0.22
Cedar Rapids *	44	—12	22.1	1.48	Shaw, Fort.	65	—1	36.2	0.17
Cedar Rapids b *	46	—12	20.0	2.46	<i>Nebraska.</i>				
Cresco *	46	—12	20.2	1.49	Crete	66	—9	28.4	0.71
Des Moines	55	—10	25.9	1.73	De Soto *	56	—7	27.1	1.73
Guttenberg *	48	—12	18.3	2.26	Fairbury	61	—7	27.1	1.17
Humboldt *	52	—10	23.6	0.96	Fremont	62	—7	26.3	1.07
Independence *	43	—10	23.2	1.80	Genoa	68	—4	29.5	0.65
Logan *	48	0	25.6	1.40	Harvard	58	6	29.0	1.75
Fort Madison *	53	0	23.5	1.80	Marquette	74	—13	33.7	0.05
Manchester	50	—8	23.5	2.51	Robinson, Fort.	74	—13	33.7	0.05
Monticello	46	—11	22.6	2.48	Stockham	74	—13	33.7	1.85
Mount Vernon *	48	—10	25.6	1.60	<i>Nevada.</i>				
Muscateine *	47	—7	19.7	2.32	McDermitt, Fort	56	5	34.6	0.94
Oskaloosa *	57	—16	24.1	1.60	<i>New Hampshire.</i>				
Oskaloosa b *	51	—16	20.4	1.82	Antrim				4.35
West Union *	46	—10	20.4	1.82	Ashland				5.15
<i>Kansas.</i>					Belmont				4.46
Atchison *	58	1	31.5	1.10	Bristol				2.44
Elk Falls *	47	5	37.2	1.00	Lake Village				4.49
Emporia *	60	6	37.2	0.70	Nashua	59	6	28.8	2.58
Fort Scott	63	0	37.2		Wiers Bridge				4.74
Independence *	65	1	36.3	0.95	Wolfborough				4.83
Lawrence	57	2	32.5	1.25	Woodstock				5.05
Manhattan a	58	4	31.7	0.57	<i>New Jersey.</i>				
Manhattan c	54	—5	32.8	0.55	Beverly *	60	10	35.0	2.80
Ninnescah *	69	3	35.7	0.72	Clayton *	60	9	35.6	2.65
Salina *	53	14	35.0	0.02	Dover	57	6	32.4	4.10
Sherlock	71	3	35.1	1.12	Moorestown	50	7	34.6	3.07
Sterling	65	3	34.5	1.13	Patterson *	54	17	33.5	3.28
Wellington *	57	9	34.9	1.57	Phillipsburg *	50	20	31.8	2.40
W. Leavenworth	57	6	34.5	0.40	Princeton	59	10	34.2	2.54
Westmoreland *	58	4	31.0	1.12	Readington *	62	14	39.3	3.00
Wyandotte *	56	2	29.2	0.80	Somerville	54	10	33.9	2.47
Yates Centre *	60	2	32.4	1.08	Vineand	60	10	35.2	3.48
<i>Kentucky.</i>					<i>New Mexico.</i>				
Frankfort	60	8	36.4	2.69	Gallinas Spring	57	19	35.0	1.00
Richmond	60	6	35.8	2.55	Puerto de Luna *	70	10	41.0	0.66
<i>Louisiana.</i>					Union, Fort	65	9	35.6	1.42
Grand Coteau	73	28	54.4	2.70	Wingate, Fort	62	3	34.6	1.00
Liberty Hill *	75	34	54.5	2.47	<i>New York.</i>				
Luling *	76	20	50.2	4.42	Auburn	55	7	31.7	2.78
Morgan City *	71	20	48.5	6.10	Columbus, Fort.	59	14	35.5	2.50
Point Pleasant *	73	21	48.5	3.27	Couperstown *	54	4	27.5	2.15
<i>Maine.</i>					David's Island	56	11	33.4	3.30
Bar Harbor	56	6	34.0	4.20	Factoryville *	52	4	29.4	1.26
Buckfield			1.73		Humphrey	46	5	25.2	3.31
Cornish *	49	0	23.9	3.30	Ithaca	54	2	29.8	1.63
Gardiner	54	5	25.9	4.00	LeRoy	56	1	28.8	3.23
Kent's Hill	50	0	21.5	2.41	Madison Barracks	54	3	26.2	3.18
Orono *	56	2	25.0	5.64	Menand Station *	56	8	29.1	1.48
Preble, Fort	54	10	29.2	1.61	Mountainville	59	7	32.1	2.59
<i>Maryland.</i>					Niagara, Fort.	52	7	30.1	1.45
Cumbarland	58	8	35.4	1.55	North Volney *	53	7	27.7	3.65
Fallston *	65	11	34.8	2.64	Palermo *	47	5	25.6	3.93
Great Falls *	60	12	35.3	2.16	Palmyra *	47	5	31.6	
McDonogh	60	8	34.2	1.36	Penn Yan				1.35
McHenry, Fort	62	15	38.4	2.50	Plattsburg B's	51	1	21.8	1.91
Woodstock	60	6	34.8	3.02	Setauket	59	14	35.8	4.00
<i>Massachusetts.</i>					West Point	57	5	32.9	4.60
Amherst a *	55	8	30.4	3.90	White Plains	55	7	38.4	4.50
Amherst b *	65	6	29.6	3.54	<i>North Carolina.</i>				
Blue Hill Obs'y	59	7	29.7	2.20	Lenoir *	64	13	32.0	
Deerfield	56	5	28.3	0.97	Lincolnton *	58	17	38.2	3.43
Dudley	57	1	29.1	2.72	Raleigh	72	26	44.0	3.90
Fall River *	58	11	33.4	3.56	Reidsville *	80	22	40.0	0.18
Leicester	57	4	27.5	3.96	Statesville *	62	24	42.1	3.02
Mendon *	56	10	29.3		Wake Forest *	69	20	43.1	3.84
Milton	61	10	32.6	2.00	Weldon	68	22	42.4	3.30
New Bedford	51	9	32.9	3.22	<i>Ohio.</i>				
Princeton	56	4	27.0	1.91	Cleveland *	62	3	32.7	1.59
Somerset *	67	7	33.0	2.60	Clyde *	55	2	35.4	5.04
Taunton	61	9	33.3	2.49	College Hill *	49	2	35.0	1.60
Worcester *	58	7	28.9	3.09	Forstoria *	53	4	29.3	
Williamstown	59	5	28.0	3.43	Garrettsville	61	—13	29.4	1.78
Westborough *	64	9	32.7	3.07	Hiram *	59	1	28.9	2.02
<i>Michigan.</i>					Jacksonborough *	59	5	31.1	1.90
Birmingham	48	—7	26.2		McConnellsville *	68	2	33.4	1.75
Brady, Fort	42	—15	22.1	4.72	Napoleon *	52	—4	31.4	2.10
Harrisville *	48	—11	26.3		North Lewisburg	55	2	31.7	1.55
Hudson	47	—7	1.62		Portsmouth	66	8	35.8	1.85
Kalamazoo	51	3	26.3		Ruggles *	51	2	31.2	1.35
Lansing	48	—6	27.1	2.86	Tiffin *	54	2	30.0	1.89
Manistique	46	—8	25.7	3.20	Westerville	58	1	31.5	1.38
Mottville *	46	4	3.00		Wauseon	54	—7	28.3	2.57
Pentwater	52	6	28.2	3.58	West Milton *	56	0	27.0	2.25
Swartz Creek	50	—6	27.7	3.42	Yellow Springs	56	0	33.3	1.59
Traverse City *	43	2	4.94		<i>Oregon.</i>				
<i>Minnesota.</i>					Albany *	60	30	44.6	7.04
Minneapolis *	48	—15	20.5	0.89	Bandon *	60	32	45.9	13.27
Northfield	51	—16	22.0	0.09	East Portland *	54	22	43.9	4.13
Snelling, Fort	52	—21	21.3	0.48	Eola *	53	27	43.7	7.41
<i>Missouri.</i>					Klamath, Fort	52	14	34.8	3.66
Carthage	64	—3	38.4	1.64	<i>Pennsylvania.</i>				
Centerville	64	—5	2.85		Altoona	55	3	25.6	1.73
Conception	56	—7	29.5	1.30	Bloomington *	54	—1	31.1	2.10
Frankford *	70	—9	2.23		Catawissa	56	5	30.2	2.33

Meteorological record of voluntary observers, etc.—Continued.

Stations.	Temperature.				Stations.	Temperature.			
	Maximum.	Minimum.	Mean.	Rainfall.		Maximum.	Minimum.	Mean.	Rainfall.
<i>Pennsylvania—Con.</i>	°	°	°	Inches	<i>Vermont—Continued</i>	°	°	°	Inches
Chambersburg *	66	10	34.5	1.05	Charlotte *	56	0	24.5	2.20
Drifton	58	—4	28.1	2.82	Dorset	61	0	26.0	3.03
Dyberry *	48	—10	27.7	2.23	Lunenburg	52	—4	23.0	1.70
Easton	58	10	34.4	3.30	Newport *	48	—10	20.4	2.88
Fallington	58	10	34.4	3.26	Post Mills Village *	44	—14	19.5	
Franklin *	55	—1	26.2	2.58	Strafford	50	0	22.5	3.60
Germanstown *	56	11	33.3	3.33	Poultney	51	—2	26.0	3.47
Grampian Hills *	50	—8	24.2	2.72	<i>Virginia.</i>				
Mahanoy Plane *	52	8	33.9	4.17	Accotink *	66	13	38.6	1.96
Quakertown a	52	9	30.7	3.75	Bird's Nest *	67	20	42.6	3.15
Quakertown b	48	8	31.2	1.20	Bruington				4.09
Troy	48	—1	28.3	5.89	Dale Enterprise *	62	9	39.5	2.53
Wellsborough *	48	—2	31.3	4.18	Marion *	68	16	35.0	2.60
West Chester	57	9	33.7	4.68	Monroe, Fort	65	21	42.2	3.08
Wilkesbarre *	56	5	32.3	1.91	Snowville *	62	22		
Wysox	56	0	26.5	1.91	Summit	62	9	35.5	
<i>South Carolina.</i>					Variety Mills *	60	11	37.6	2.85
Aiken *	73	24	46.0	2.28	Wayhville	65	14	36.1	3.02
Kirkwood *	58	18	38.9	3.79	<i>Washington Territory.</i>				
Pacolet *	65	22	40.7	3.06	Bainbridge Island *	60	24	43.5	6.22
Spartanburg *	70	0	25.0	2.60	Kenewick *	56	10	37.0	1.03
Stateburg *	66	24	45.9	2.42	Pleasant Grove *	55	6		1.55
<i>Tennessee.</i>					Tacoma *	60	28	41.4	6.13
Ashwood *	63	17	39.5	2.77	Townsend, Fort	60	25	45.3	1.70
Milan	65	17	39.7	2.91	<i>West Virginia.</i>				
<i>Texas.</i>					Helveta *	70	0	34.4	3.19
Austin *	79	29	53.9	2.69	Parkersburg	71	—1	34.8	0.16
Cleburne *	84	16	46.1	1.56	<i>Wisconsin.</i>				
Comfort				1.04	Embarras *	46	—22	22.8	3.75
Concho, Fort	81	15	51.3	0.70	Madison	51	—13	23.7	3.59
Coriscana				3.26	Manitowoc	46	—15	20.5	1.34
Huntsville *	79	25	45.4	3.8	Neillsville *	36	—33	11.2	3.25
Midland	76	12	45.4	0.15	Wausau	48	—22	20.5	2.48
New Ulm	82	26	54.4	3.79	<i>Wyoming.</i>				
<i>Vermont.</i>					Brigder, Fort	55	—3	26.8	trace
Brattleborough	54	—4	28.6	2.75	Fred Steele, Fort	56	—20	28.0	0.22
Burlington	56	—1	25.8	2.07					

ANNUAL MEAN TEMPERATURE AND PRECIPITATION FOR 1885, WITH NORMALS FOR A SERIES OF YEARS.

In the following table are given, for Signal Service stations, the annual normal temperatures; the annual means for the year 1885; the maximum and minimum temperatures for 1885, with the dates of occurrence; the annual average precipitation; the total precipitation for 1885, with the departures from the average:

Stations.	Temperature.						Precipitation.			
	Normal.	Mean for 1885.	Departure.	Extremes for 1885.			Normal.	Total for 1885.	Departure.	
				Maximum.	Date.	Minimum.				Date.
<i>New England.</i>										
Eastport.....	41.3	41.4	+0.1	81.6	June 25	-11.0	Jan. 22, 23	50.43	54.06	+3.63
Portland.....	46.8	45.8	-1.0	92.1	June 16	-4.8	Feb. 3	39.74	39.95	+0.21
Mount Washington.....	36.1	24.6	-1.5	69.4	July 9	-50.0	Jan. 23	85.16	78.37	-6.79
Boston.....	48.3	47.2	-1.1	82.8	July 21	-1.7	Jan. 22	48.28	55.10	+3.82
Boston Island.....	49.6	48.5	-1.1	87.8	July 18	-5.5	Jan. 22	48.68	39.37	-15.61
New Haven.....	49.9	47.3	-2.6					50.85	38.32	-12.53
<i>Mid. Atlantic states.</i>										
Albany.....	48.4	45.9	-2.5	96.6	July 17	-10.5	Jan. 29	38.13	34.39	-3.74
New York City.....	51.3	49.8	-1.5	95.9	July 21	0.0	Feb. 11	43.58	42.12	-1.46
Sandy Hook.....	52.0	50.4	-1.6	96.7	July 26	1.5	Feb. 11	51.49	38.42	-13.07
Barnegat City.....	51.5	51.2	-0.3	92.3	July 21	4.7	Feb. 11	50.18	27.64	-22.54
Atlantic City.....	52.0	50.6	-1.4	90.9	July 10	5.0	Feb. 11	43.21	38.44	-4.78
Philadelphia.....	53.2	51.2	-2.0	97.0	July 18	0.1	Feb. 11	41.67	34.75	-6.92
Baltimore.....	55.6	53.9	-1.7	98.7	July 21	3.4	Feb. 11	42.26	46.04	+3.78
Washington City.....	55.0	53.0	-2.0	99.1	July 18	2.4	Feb. 11	43.37	44.84	+1.47
Chincoteague.....	55.0	54.2	-0.8	93.9	July 18	8.0	Feb. 11	38.48	41.85	+3.37
Cape Henry.....	58.9	57.3	-1.6	95.8	July 18	13.6	Feb. 11	56.29	36.55	-19.74
Norfolk.....	59.3	58.4	-0.9	98.8	July 9	14.4	Feb. 21	51.62	43.25	-8.37
Lynchburg.....	57.4	54.7	-2.7	97.0	July 22	3.7	Feb. 11	42.57	46.31	+3.78
<i>South Atlantic states.</i>										
Kitty Hawk.....	59.8	58.8	-1.0					64.65	54.78	-9.87
Hatteras.....	61.8	60.5	-1.3					74.54	68.02	-6.52
Fort Macon.....	62.4	60.8	-1.6	88.5	Aug. 25	18.3	Feb. 11, 21	59.16	62.34	+3.18
Smithville.....	63.5	61.4	-2.1	92.0	June 29	16.5	Feb. 21	50.99	43.07	-7.92
Charlotte.....	60.6	58.4	-2.2	95.0	July 22	10.8	Jan. 3	54.10	58.35	+4.25
Augusta.....	64.5	61.6	-2.9	101.4	July 30	14.7	Feb. 11	49.00	50.67	+8.89
Charleston.....	66.0	65.0	-1.0	96.4	June 29	22.0	Feb. 11	59.91	67.93	+8.02
Savannah.....	66.9	65.6	-1.3	95.2	July 31	22.5	Feb. 11	52.67	73.94	+21.25
Jacksonville.....	69.3	67.7	-1.6	95.8	June 29	31.5	Jan. 18	55.31	82.00	+26.69
<i>Florida peninsula.</i>										
Sanford.....	71.6	69.4	-2.2	96.5	June 29	32.0	Dec. 28	45.71	55.58	+10.87
Cedar Keys.....	71.1	68.5	-2.6	91.8	June 28 } July 1 }	31.0	Dec. 15	56.70	66.08	+9.38
Key West.....	77.6	76.5	-1.1	94.0	Aug. 12	50.2	Dec. 27	40.12	34.03	-6.09

Annual mean temperature, etc.—Continued.

Temperature.										Precipitation.		
Stations.	Normal.	Mean for 1885.	Departure.	Extremes for 1885.				Normal.	Total for 1885.	Departure.		
				Maximum.	Date.	Minimum.	Date.					
<i>East Gulf states.</i>												
Atlanta.....	61.7	58.6	-3.1	91.2	July 30	8.0	Feb. 11	56.23	57.11	+0.88		
Montgomery.....	65.6	63.0	-2.6	98.0	July 31	15.5	Feb. 11	53.25	58.89	+5.64		
Pensacola.....	68.4	65.8	-2.6					58.56	64.57	-3.99		
Mobile.....	67.1	64.2	-2.9	94.2	Aug. 8	19.9	Jan. 18	65.97	64.00	-1.97		
Vicksburg.....	65.7	63.8	-1.9	98.7	July 31	17.2	Feb. 11	61.38	54.28	-7.10		
New Orleans.....	69.2	67.4	-1.8	93.2	Aug. 7	27.7	Jan. 18	64.36	64.18	-0.18		
<i>West Gulf states.</i>												
Fort Smith.....	59.5	58.1	-1.4	98.6	July 31	1.0	Feb. 10	48.64	31.61	-17.03		
Little Rock.....	62.3	61.0	-1.3	100.0	July 31	9.6	Jan. 17	60.35	35.81	-24.54		
Shreveport.....	65.6	63.9	-1.7	100.7	Aug. 1	13.0	Jan. 17	54.11	58.60	+4.49		
Palestine.....	65.0	63.6	-1.4	97.5	Aug. 10	11.1	Jan. 17	47.56	41.25	-6.31		
Indianola.....	70.1	68.9	-1.2	96.2	July 28	21.3	Jan. 17	38.72	38.58	-0.14		
Galveston.....	70.1	69.8	-0.3	94.5	July 19	23.4	Jan. 17	52.30	62.56	+10.26		
San Antonio.....	69.0	69.5	+0.5	97.8	Aug. 4, 6, 7	25.8	Dec. 14	32.96	29.62	-3.34		
<i>Rio Grande Valley.</i>												
Rio Grande City.....	73.4	72.5	-0.9	108.6	Aug. 6	24.2	Jan. 17	22.52	26.52	+4.00		
Brownsville.....	72.8	71.1	-1.7	95.4	May 30	27.0	Jan. 17	33.01	31.83	-1.18		
<i>Tennessee.</i>												
Nashville.....	59.7	56.5	-3.2	96.1	July 30	2.2	Jan. 22	53.66	42.95	-10.71		
Memphis.....	61.1	60.2	-0.9	98.5	Aug. 10	2.7	Jan. 22	56.10	37.41	-18.69		
Chattanooga.....	60.4	57.7	-2.7	96.1	July 30	6.2	Feb. 11	59.84	56.61	-3.23		
Knoxville.....	57.3	55.6	-1.7	94.0	July 30	1.0	Feb. 11	53.87	54.70	+0.83		
<i>Ohio Valley.</i>												
Pittsburg.....	52.0	50.7	-1.3	99.0	July 21	-8.8	Feb. 11	36.87	34.12	-2.75		
Columbus.....	52.7	48.8	-3.9	95.7	July 20	-11.0	Feb. 11	42.36	42.25	-0.11		
Indianapolis.....	53.1	49.3	-3.8	95.1	Aug. 9	-11.3	Jan. 22	47.01	39.51	-7.50		
Greencastle.....		48.8		92.4	July 20	-14.7	Jan. 22	50.11				
Cincinnati.....	55.9	51.0	-4.9	96.6	July 20	-9.6	Feb. 11, 21	43.74	33.94	-9.80		
Louisville.....	56.8	55.5	-1.3	97.2	July 21	-5.0	Jan. 22	49.04	47.23	-1.81		
<i>Lower lake region.</i>												
Detroit.....	48.2	46.9	-1.3	89.5	July 8	-11.6	Feb. 10	34.76	28.24	-6.52		
Toledo.....	50.2	47.3	-2.9	93.2	July 21	-15.5	Feb. 11	32.74	33.19	+0.45		
Sandusky.....	51.0	47.0	-4.0	90.0	June 7	-14.9	Feb. 11	40.42	34.23	-6.19		
Cleveland.....	49.0	45.6	-3.4	90.1	July 17	-15.1	Feb. 11	38.03	39.93	+1.90		
Erie.....	49.4	46.0	-3.4	89.8	July 6	-12.3	Feb. 11	42.67	52.13	+9.46		
Buffalo.....	46.6	43.5	-3.1	87.4	July 6	-12.8	Feb. 11	37.06	52.36	+15.30		
Rochester.....	46.9	43.7	-3.2	94.7	July 17	-11.0	Feb. 11	36.77	28.30	-8.47		
Oswego.....	47.4	42.3	-5.1	89.6	July 17	?	Feb. 11	35.70	33.14	-2.56		
<i>Upper lake region.</i>												
Duluth.....	39.7	36.3	-3.4	92.7	July 30	-41.2	Jan. 2	34.01	20.14	-13.87		
Marquette.....	41.0	36.4	-4.6	88.8	July 16	-15.3	Mar. 16	33.35	28.85	-4.50		
Escanaba.....	40.4	37.6	-2.8	87.2	July 28	-26.1	Jan. 28	35.60	31.42	-4.18		
Milwaukee.....	45.0	41.4	-3.6	92.8	July 28	-23.6	Feb. 11	33.63	33.77	+0.14		
Chicago.....	48.7	46.4	-2.3	93.9	July 20	-13.7	Feb. 11	37.34	44.37	+7.03		
Grand Haven.....	46.9	43.0	-3.9	85.7	July 22	-7.2	Feb. 21	39.85	35.81	-4.04		
Mackinaw City.....	40.0	38.0	-2.0	86.0	July 8	-33.4	Feb. 6	40.32	38.48	-1.84		
Alpena.....	41.2	37.8	-3.4	88.0	Sept. 26	-23.0	Feb. 6	37.98	34.74	-3.27		
Port Huron.....	45.2	41.7	-3.5	89.9	June 20	-25.0	Feb. 11	34.65	33.81	-0.84		
<i>Extreme northwest.</i>												
Fort Buford.....	38.3	39.9	+1.6	96.0	July 14	-45.5	Jan. 1	14.63	15.56	+0.93		
Bismarck.....	39.4	39.4	0.0	97.4	July 29	-35.2	Jan. 1	21.43	13.09	-8.39		
Moorhead.....	36.6	37.4	+0.8	92.0	Sept. 25	-34.9	Jan. 1	29.24	22.58	-6.66		
Saint Vincent.....	33.2	33.4	+0.2	91.1	July 29	-40.0	Jan. 1	19.42	16.58	-2.84		
<i>Upper Miss. valley.</i>												
Saint Paul.....	43.9	42.0	-1.9	94.7	July 30	-35.6	Jan. 2	29.54	25.33	-4.21		
La Crosse.....	46.7	44.2	-2.5	92.0	July 20, 28	-25.0	Jan. 22	34.35	30.70	-3.65		
Dubuque.....	48.1	44.8	-3.3	97.1	July 30	-22.5	Jan. 28	39.72	40.45	+0.73		
Davenport.....	49.7	46.9	-2.8	97.4	July 30	-17.8	Jan. 28	36.13	34.35	-1.78		
Des Moines.....	48.7	46.8	-1.9					42.45	35.03	-7.42		
Keokuk.....	51.8	48.3	-3.5	99.0	July 30	-14.5	Feb. 10	38.13	35.11	-3.02		
Springfield.....	53.0	50.8	-2.2	96.2	July 30	-13.7	Jan. 22	47.52	38.61	-8.91		
Saint Louis.....	55.4	54.6	-0.8	96.6	July 30	-9.7	Jan. 22	37.80	45.99	+7.71		
Cairo.....	58.1	56.1	-2.0	95.8	July 30	-4.0	Jan. 22	40.74	31.99	-14.75		
<i>Missouri valley.</i>												
Fort Bennett.....	43.6	45.0	+1.4	102.1	July 28	-39.9	Jan. 1	17.85	19.55	+1.70		
Yankton.....	45.6	44.8	-0.8	100.7	July 29	-24.0	Jan. 2	28.21	30.18	+1.97		
Huron.....	41.8	41.6	-0.2	98.2	July 30	-33.0	Jan. 1	24.07	25.78	+1.71		
Omaha.....	49.6	48.0	-1.6	98.8	July 28	-16.2	Feb. 10	36.45	39.68	+3.23		
Leavenworth.....	53.3	51.1	-2.2	97.8	July 19	-18.4	Jan. 1	38.97	43.64	+4.67		
<i>Northern slope.</i>												
Fort Assinabouine.....	40.3	45.3	+5.0	96.4	Aug. 14	-20.8	Jan. 1	17.84	6.82	-11.02		
Fort Benton.....	42.6	40.6	-2.0	104.9	Aug. 14	-37.9	Jan. 19	12.50	14.94	+2.44		
Fort Shaw.....	41.2	45.5	+4.3	96.2	Aug. 14	-28.0	Jan. 15	13.82	12.50	-1.26		
Helena.....	42.6	45.4	+2.8	92.7	Aug. 14	-15.5	Jan. 15	16.48	10.99	-5.49		
Fort Custer.....	43.6	46.2	+2.6					14.80	9.65	-5.15		
Poplar River.....		37.6		94.4	July 14	-63.1	Jan. 1		11.93			
Fort Maginnis.....	38.8	43.5	+4.7	95.6	Aug. 14	-17.0	Feb. 2	11.14	13.90	+2.82		
Deadwood.....	41.2	43.4	+2.2	96.0	July 28	-15.5	Jan. 19	26.11	28.43	+2.37		
Cheyenne.....	44.2	44.0	-0.2	88.2	July 7	-18.0	Jan. 16	11.07	16.12	+5.05		
North Platte.....	47.7	47.1	-0.6	97.6	July 15	-22.2	Feb. 18	19.32	22.03	+2.71		
<i>Middle slope.</i>												
Denver.....	49.2	49.2	0.0	97.3	July 15	-10.9	Jan. 16	14.99	15.95	+0.96		
Pike's Peak.....	19.1	19.2	+0.1	57.0	July 15	-29.4	Jan. 16	29.57	30.48	+0.91		
Dodge City.....	52.8	51.5	-1.3	97.3	July 20	-18.2	Jan. 1	21.11	23.71	+2.60		
West Las Animas.....	49.2	50.2	+1.0	105.2	July 15	-25.9	Jan. 1	13.41	14.23	+0.82		
Fort Elliott.....	54.6	54.4	-0.2	98.8	July 8	-0.0	Jan. 19	23.97	37.07	+13.10		
<i>Southern slope.</i>												
Fort Sill.....	60.6	58.1	-2.5	103.5	Aug. 4	1.0	Jan. 1	33.38	33.05	-0.33		
Fort Davis.....	59.8	60.9	+1.1	97.7	June 12	5.3	Jan. 16	20.38	14.22	-6.16		
<i>Southern plateau.</i>												
Prescott.....	52.1	53.3	+1.2	98.5	July 13	-4.0	Jan. 1	16.04	10.11	-5.93		
Fort Grant.....	60.0	60.0	0.0	99.6	July 14	20.3	Jan. 1	17.14	9.21	-7.93		
Fort Thomas.....	61.4	61.9	+0.5	105.8	July 14	71.8	Dec. 15	12.77	8.70	-4.07		
Fort Apache.....	52.0	54.1	+2.1	101.4	July 12	-4.0	Jan. 1	23.87	15.58	-8.29		
El Paso.....	63.2	63.0	-0.2	110.1	Aug. 6	12.5	Dec. 15	13.14	7.31	-5.83		
Santa Fe.....	47.9	47.7	-0.2	88.5	July 14	-3.2	Jan. 16	13.89	14.89	+1.00		

Annual mean temperature, etc.—Continued.

Stations.	Temperature.							Precipitation.		
	Normal.	Mean for 1885.	Departure.	Extremes for 1885.			Normal.	Total for 1885.	Departure.	
				Maximum.	Date.	Minimum.				Date.
<i>Middle plateau.</i>	0	0	0	0		0		<i>Ins.</i>	<i>Ins.</i>	<i>Ins.</i>
Salt Lake City	51.1	52.3	+1.2	100.3	Aug. 16	4.8	Jan. 21	16.97	19.69	+2.72
Winnemucca	49.0	51.5	+2.5	94.1	July 14	8.9	Jan. 1	9.62	11.80	+2.18
<i>Northern plateau.</i>										
Lewiston	50.4	53.2	+2.8	105.2	Aug. 18	-10.0	Jan. 20	18.05	10.44	+1.39
<i>N. Pac. coast region.</i>										
Olympia	49.2	51.8	+2.6	97.0	July 27	22.7	Dec. 11	56.27	41.95	-14.32
Portland	52.4	54.5	+2.1	99.0	July 6	7.0	Jan. 1	53.38	39.59	-13.79
Roseburg	51.9	54.7	+2.8	100.8	July 6	27.3	Jan. 12	35.72	30.91	-4.81
Port Canby	51.8			75.4	May 10	30.9	Jan. 11	58.46		
Tatoosh Island	50.1			74.0	July 5	32.5	Jan. 16	84.48		
<i>Mid. Pac. coast reg.</i>										
Cape Mendocino	51.2	52.8	+1.6					17.99	20.37	+2.38
Red Bluff	62.4	64.4	+2.0	108.0	Aug. 12	33.0	<div> Jan. 12 Jan. 25 Dec. 31 </div>	28.24	29.63	+1.39
Sacramento	59.2	61.2	+2.0	105.0	Aug. 15, 17	34.2	Jan. 24	23.57	20.72	-2.85
San Francisco	55.7	56.9	+1.2					24.03	24.90	+0.87
<i>S. Pac. coast region.</i>										
Los Angeles	60.5	63.0	+2.5	108.5	Sept. 2	36.3	Feb. 13	18.25	10.69	-7.56
San Diego	60.5	62.0	+1.5					0.88	6.14	+5.26

*Temperature and rainfall for February approximated; no record for minimum temperature for June.

On chart v are shown, by dotted isothermal lines, the annual mean temperature for 1885. On the same chart are exhibited, by the unbroken lines, the departures from the annual normal, as deduced from Signal Service observations, covering periods generally ranging from ten to fifteen years. From this chart it will be seen that the mean temperature for the year 1885 was below the normal in all districts east of the Rocky Mountains, except in the upper Missouri valley, extreme northwest, and in northern New England, where the annual means were normal, or slightly above. Over the greater part of the country to the eastward of the Mississippi River the annual mean temperature was from 2° to 4

Connecticut, and Block Island, Rhode Island, the deficiencies were 12.53 and 15.61 inches, respectively.

In the Ohio Valley all stations show deficiencies, the average for the district being 6.12 inches below the normal.

In Tennessee there was a slight excess at Knoxville, and marked deficiencies in the western part of the state, being 10.71 inches, at Nashville, and 18.69 inches, at Memphis.

In the lower lake region there is an average excess of about one-half inch, the extreme departures being a deficiency of 8.47 inches, at Rochester, New York, and an excess of 15.30 inches, at Buffalo, New York.

In the extreme northwest, upper Mississippi valley, and upper lake region there is a general deficiency, except at Chicago, Illinois, excess 7.03 inches; Saint Louis, Missouri, excess 7.71 inches; and Milwaukee, Wisconsin, and Dubuque, Iowa, nearly normal.

All stations in the Missouri valley show an excess, the average for the district amounting to 2.06 inches.

On the Pacific coast there were marked deficiencies in the northern and southern districts, while in the middle Pacific coast region the precipitation averaged about normal.

NOTES AND EXTRACTS.

The following extract is from the December, 1885, report of the "Alabama Weather Service," under direction of Prof. P. H. Mell, jr., Auburn:

The month of December has been generally mild and pleasant. Most of the stations reported high temperatures for this season of the year. The cold days of the month were the 6th, 11th, 15th, 27th, and 28th.

The rainfall was below the average over a greater part of the state, and some stations record an inappreciable fall of rain. Trinity, for instance, reported "not enough to measure." In north Alabama there was a slight fall of snow on the 5th and 14th, not enough, however, to cover the ground. Ice and frost occurred frequently during the month, and at times the ground was quite hard frozen.

Some stations reported beautiful sunsets and bright afterglows.

Greensborough furnishes the following items: "We have had the highest and lowest barometer readings for December that have occurred during the several years of my observation, viz., highest, 30.500, lowest, 29.600; range, 0.900."

Trinity states that "the weather for the month of December has been exceptionally fine; not too warm nor too cold. We have had some ice, and a little sprinkle of snow on the 14th. There has been but little rain; some days of misty weather, and once or twice a slight shower. The roads have been better in this country than I ever knew them at this season of the year. The freezes have been light."

Valley Head states that "a gale passed over this place on the night of the 12th. The wind blew at the rate of about fifty miles per hour and continued for several hours. There was no material damage, so far as I know. The rainfall was 1.40 inches. The wind was from the east."

Chattanooga states that "the mean temperature for December was 2° 4 colder, and the total precipitation 2.22 inches less, than the average for the month, while the total movement of wind was two hundred and seventy-six miles greater. The greatest hourly wind-velocity occurred on the 5th, and was thirty-eight miles, blowing from the southwest, which proved also to be the highest velocity occurring during the year. The mean of the minimum temperature was about 5° higher than the average, thus making the month seem warmer than usual, although the actual facts are that it was 2° 4 colder."

Tuscumbia reports for the 20th the following: "To-day, at 12 m., I witnessed a solar halo about 40° in diameter. The sky was overcast with a very thin white cloud, but the sun shone through with some strength. The outer portion of the circle was perfectly white, the centre was of a white milky appearance about 20° in diameter; between these two portions there was a ring of a dark red purplish tint. This halo continued from 12 m. until 4 p. m. At night there was a lunar halo and a corona around Venus."

State summary.

Mean temperature, 44° 1; highest temperature, 74°, at Eufaula, on the 9th; lowest temperature, 12°, at Gadsden, on the 6th; range of temperature, 62°; greatest monthly range of temperature, 50°, at Eufaula; least monthly range of temperature, 39°, at Jacksonville; mean daily range, 16° 1; greatest daily range of temperature, 38°, at Gadsden, on the 4th; least daily range of temperature, 0°, at Centre, on the 1st.

Mean depth of rainfall, 2.87 inches; mean daily rainfall, 0.093; greatest depth of monthly rainfall, 6.25 inches, at Gadsden; least depth of monthly rainfall, inappreciable, at Mount View; greatest daily rainfall average for state, 1.90 inches, on the 18th; greatest daily local rainfall, 4.18 inches, at Mobile, on the 6th.

Average number of days on which rain fell, 6; average number of cloudy days, 9; average number of fair days, 8; average number of clear days, 14; warmest days, 4th and 8th; coldest days, 6th, 11th, 15th, 27th, 28th.

Prevailing direction of wind, northwest.

The following letter has been received from Mr. Ellwood Cooper, of Santa Barbara, Santa Barbara county, California:

SANTA BARBARA, December 12, 1885.

Brig. Gen'l HAZEN, Washington:

DEAR SIR: My last report to your department was partially published in the WEATHER REVIEW of April, 1884. That report gave the rainfall from 1870 to, and including, that of the winter of 1883-'84. The rainfall of 1884 and 1885 was 12.56 inches, 9.12 inches falling from October 8th to December 31st, and 3.86 falling from January 1st to May.

From my letter containing the information given in the report, as stated above, I laid down the theory that during the winters when we had heavy rains before January 1st we were likely to have light rains after January 1st. In support of this I called your attention to the winters of 1871-'72, 1878-'79, and 1880-'81; I have now to add the rainfall of the past winter, demonstrating the same condition as the three winters above alluded to. I also wrote in said communication that during the spring of 1884 we had a series of warm south winds, which caused the unprecedented rainfall of that season, and that since my sojourn in the country, from 1870 down to that time, that the wind had not blown one single hour steadily from that quarter. In my theories there laid down and (?) the statement that by close observation we could, to a certain extent, foretell the probable rainfall each winter.

I now beg to call your attention to the storm of November last, commencing the 15th and ending the night of the 24th. (I was not at home, or I should have reported earlier.) There is no record of so much rain falling in any year, since records have been kept, in the month of November. I have learned from my wife and the men working on the ranch that a very warm wind blew from the southeast (more southerly than easterly), and part of the time due south, the wind on two different days and nights amounting to a gale; many of my fruit trees were uprooted, some broken square off above the ground. This storm commenced apparently without any preparation. In Los Angeles county, twenty miles from the sea, there were no violent winds. I am therefore convinced that there must have been a strong wind blowing from the Gulf of California some time previous to the commencement of the storm here.

Our usual southeast storms cross the country north of Fort Yuma, giving at San Diego about one-third as much rain as at Santa Barbara. The storm of November just passed, the greatest amount of rain was condensed between the first and second ranges of mountains; at the base of the Sierra Madre there were 7 inches of rainfall; at Newhall, 9 inches; in the Ajai Valley, 15; in the Santa Inez Valley, back of Santa Barbara, 19; and at San Luis Obispo, 22 to 24 inches. On the night of the 17th 9 inches of rain fell in a few hours at the latter place. In the town of Los Angeles, 6 inches; Santa Barbara, 9 inches; at Ellwood (my home), 10 inches; at the south base of the Santa Inez range, Glen Annie, there were 14 inches, while at the base on the north side there were 19 inches. This warm wind blowing from the mouth of the Gulf of California was kept westward of the high range on the peninsula and carried directly over the first ranges from San Pedro to Point Conception; on reaching the second ranges, was met by the cold northwest trades, condensed, and hence the greatest precipitation in the valleys back from the coast. In the Paso Robles country there was not much rain, probably, from the reports, about 4 inches. We have had up to date since October 15th, 10.87 inches of rain, and according to my theory we must not expect very much more after January 1st. I do not predict, but the fact that every winter since 1870 that gave us 8 inches or more before January 1st, gave us but little after January 1st. This very strong probability should put farmers and fruit growers on their guard, and they should lose no time in preparing for such an alternative.

I have the honor to be your obedient servant,

ELLWOOD COOPER.

Since the receipt of the above, Mr. Cooper has furnished the following summary:

The review of the rainfall from 1870 to date, establishes thus far one unvarying rule, and that is, that in all our rain seasons, when there has been more than half our winter average of rain before January 1st, we have had less after January 1st, in the ratio or proportion as the amount before was greater. For example:

Season.	Before January 1.	After January 1.	Total.
	Inches.	Inches.	Inches.
1871-'72	8.50	7.44	15.88
1872-'73	8.12	6.38	14.50
1880-'81	13.50	3.06	16.56
1884-'85	9.12	3.44	12.56
1885	13.44		

While I do not pretend to know, or to predict, how much more rain we will have before the end of spring, the above table should warn every farmer and fruit-grower of the necessity of preparing their work with the expectation of having but little more. The season thus far for the cultivator is the best we had in sixteen years, and any failure in crops will be the result of neglect on the part of the farmer.

SANTA BARBARA, December 31, 1885.

The following meteorological summary and accompanying remarks are from the December, 1885, report of the "Indiana